IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.: **10/752,399**	ANSWER ACTION DATE: **MAY 01, 2008**
IN RE APPLICATION OF: **JING CHUNG CHANG, *ET AL.***	ATTORNEY DOCKET NO.: **SO-0033 US NA**
FILED: **JANUARY 06, 2004**	GROUP ART UNIT: **1791**
FOR: **PROCESS FOR PREPARING POLY (TRIMETHYLENE TEREPHTHALATE) FIBER**	EXAMINER: **PATRICK N. BUTLER**

REPLY BRIEF UNDER 37 C.F.R. § 41.41

MAIL STOP—APPEAL BRIEF PATENTS
COMMISSIONER FOR PATENTS
P.O. BOX 1450
ALEXANDRIA, VA 22313-1450

Sir:

Pursuant to 37 C.F.R. § 41.41, Applicants submit this Reply Brief in response to the Examiner's Answer of May 01, 2008.

TABLE OF CONTENTS

I. STATUS OF CLAIMS

Claims 8, 11, 14, 20, 23, 24, 26, 29, 33, 41, 42, 46-48, and 50-54 are on appeal. All claims are rejected.

Claims 1-42 were in the application as filed. In an Office Action dated June 3, 2005, all claims were rejected. Claims 1-42 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Howell, *et al.* (International Patent Publication No. WO 96/00808; *hereinafter* "Howell") in view of Hwo, *et al.*, (U.S. Patent Application Publication No. 2002/0130433 A1; *hereinafter* "Hwo"), Wandel, *et al.* (U.S. Patent Application Publication No. 2002/0132116 A1; *hereinafter* "Wandel"), and Sun, *et al.* (U.S. Patent Application Publication No. 2002/0147298 A1, *hereinafter* "Sun").

By amendment dated August 16, 2005, Claims 2, 5, 9, 10, 18, 19, 21, 28, 35, 39, and 40 were cancelled; Claims 43-56 were added; and Claims 1, 6, 7, 13, 14, 22, 26, 27, 29, 30, 31 were amended.

In an Office Action dated November 16, 2005, all of the pending Claims 1, 3, 4, 6-8, 11-17, 20, 22-27, 29-34, 36-38, and 41-56 were rejected. Claims 1, 3, 4, 6-8, 11-13, 15-17, 20, 22-26, 29-34, 36-38, and 41-55 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Howell in view of Hwo, Wandel, and Sun. Claims 14, 27 and 56 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Howell in view of Hwo, Wandel, and Sun, and further in view of Burton *et al.* (U.S. Patent No. 5,804,115, *hereinafter* "Burton").

In a response dated May 24, 2006, a Request for Continued Examination was submitted. In the subsequent Office Action, dated July 6, 2006, the rejections of record were maintained.

In a response dated November 6, 2006, Claims 1-7, 9, 10, 12, 13, 15-18, 21, 22, 25, 27, 28, 30-32, 34-40, 43-45, 49, 55, and 56 were cancelled. Claims 8, 11, 14, 20, 23, 29, 33, 41, 46, and 47 were amended.

An Office Action finally rejecting all claims was issued on January 29, 2007. An interview between the Examiner and Appellants' representative on February 13, 2007 did not result in any claims being allowed. As reported in the Examiner's interview summary, "Mr. Lerman inquired about 'advances' in prosecution in the Office Action mailed January 29, 2007, page 2, paragraph 3." "Examiner Butler clarified that the 'advances' did not pertain to allowable subject matter and that they related to the amendments presented to cancel and amend the claims."

II. GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Claims 8, 11, 14, 20, 23, 24, 26, 29, 33, 41, 42, 46-48, and 50-54 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Howell in view of Hwo, Wandel, Sun, and Burton.

Claims 8, 11, 14, 20, 23, 24, 26, 29, 33, 41, 42, 46-48 and 50-54 stand rejected under 35 U.S.C. §103(a) as being unpatentable over Scott, *et al*, (International Patent Publication

No. WO 99/19577; *hereinafter* "Scott") in view of admitted prior art (Second Information Disclosure Statement, Paragraph 2, November 28, 2005), and Hwo.

III. ARGUMENT

Appellants provide additional comments in response to the Examiner's May 01, 2008 Answer to the Appeal Brief in the present application/invention ("SO0033").

A. Differences with Prior Art References

First, Appellants summarize the current obviousness standard under 35 U.S.C. § 103(a), as set forth in *KSR International Co. v. Teleflex Inc.*, 127 S.Ct. 1727 (2007) (hereinafter "KSR"). The KSR Court stated that a "combination of familiar elements according to known methods is likely to be obvious when it does no more than yield predictable results." (KSR *at* 1739). Stated another way, if a combination of familiar elements produces unpredictable results, such combination is more than likely nonobvious under 35 U.S.C. §103(a), and thus, patentable. "An invention is unpatentable as obvious if the differences between the patented subject matter and the prior art would have been obvious at the time of invention to a person of ordinary skill in the art." *In re Translogic Tech., Inc.*, 504 F.3d 1249, 1258 (Fed. Cir. 2007).

The question then is whether the combination of familiar elements in SO0033 yielded predictable results or unexpected results over the prior art. The Howell reference disclosed poly (trimethylene terephthalate) ("PTT") bulk-continuous filament ("BCF") yarns with spinning speed of about 2,000 m/min. (See Howell, Page 11, Line 20; Example 1). On the other hand, SO0033, upon combination of its process elements, yielded a BCF yarn that can be drawn at greater than 3,500 m/min. (See SO0033, Example 1, Page 5, Paragraph [0091] of the printed patent application no. US2005/0147784).

Thus, SO0033 improves upon the Howell reference by:

100 X {3,500 m/min—2,000 m/min}/{2,000 m/min} = <u>75%</u>

Appellants submit that a 75% improvement in PTT BCF yarn drawing speed is an unexpected and an unpredictable result of the combination of so-called familiar elements of the art (combined in Claim 47, for example). From the Court's guidance in KSR, the combinations of elements, that is, the claims of SO0033, are non-obvious over the reference art.

Secondly, even the differences between the SO0033 and the combined prior art, that is, Howell, Hwo, Wandel, Sun, and Burton, are non-obvious rendering SO0033 itself non-obvious. Appellants discuss four elements of Claim 47 (the independent claim) in light of the prior art references:

1. High-Speed Spinning Process of SO0033;

2. Melt-Viscosity Range and Molecular Weight of SO0033 PTT; and

3. Intrinsic Viscosity of SO0033 PTT.

1. High Spinning Speed of SO0033 Yarns

SO0033 claims high-speed spinning of PTT bulk-continuous filament yarns for carpet use. Particularly, SO0033 claims drawing the filaments at speeds greater than 3,500 m/min. (See SO0033, Claim 47).

According to the Examiner, Howell discloses high-speed spinning of PTT BCF yarns, particularly greater than 800 m/min. The Examiner does however admit that Howell fails to teach the extent of its spinning speed above 800 m/min, that is, the upper limit of its spinning. But, because Hwo teaches extruding PTT with a draw speed of 2,450 to 10,000 m/min, according to the Examiner, it would have been obvious to combine Hwo's spinning speed with Howell's PTT BCF process that maximizes production speeds encompassing SO0033's spinning speed of greater than 3,500 m/min.

First, Appellants note that, Howell's attempt to spin at higher speeds, and its explicit claim for spinning at higher speeds, demonstrates the pertinent art's need to invent a BCF spinning process that can sustain high-speed spinning, such as SO0033's greater than 3,500 m/min process. Stated another way, from Howell, a person skilled in the art implicitly understands that high-speed spinning is a sought after objective in the field of BCF fiber spinning.

Second, Appellants disagree with the Examiner's premise for combining Howell and Hwo. Howell cautions against using higher speeds during wind-up operation of its BCF yarns because high speeds would decrease crimp development (generally, an essential feature in carpet yarn) and increase yarn shrinkage, both undesired objectives. (See Howell, Page 5, Lines 28-29). In other words, Howell recognizes problems with high-speed spinning of BCF yarns. In its Claim 1, Howell claims a spinning speed of greater than 800 m/min. Of course, one understands that greater than 800 m/min, theoretically, also encompasses, for example, 3,500 m/min, or 10,000 m/min, or even 100,000 m/min (if that were feasible). However, a reference is only good for what it fairly teaches. With that caveat, the question then is, what maximum speed did Howell envision to be fairly covered under its invention ("greater than 800 m/min")? Appellants look at the Howell specification for answer. Howell, in Example 1, demonstrates a drawing speed of about 2,000 m/min. Clearly, a person skilled in the art knows that achieving higher spinning speeds is desired objective as long as it precludes any significant detriment to other yarn properties. And Howell, if technically within its reach, would have tried to achieve the maximum spinning speed possible, unless of course, if that was not Howell's interest. But Howell restricted its process to a maximum spinning speed of about 2,000 m/min. In other words, the "greater than 800 m/min" in Howell must be interpreted to mean about 2,000 m/min or in the neighborhood of 2,000 m/min, but certainly not 3,500 m/min. Either Howell had no interest in increasing the BCF yarn's spinning speed, or that it could plain not achieve the objective are the two possible alternatives. If the first alternative is correct, then it must mean that achieving higher spinning speed was simply a matter of extruding at a faster rate without any consequences, and most processing units could simply increase their productivity beyond what is currently in use, at will. Appellants submit that such contention is simply absurd. Increasing productivity is still a sought after objective in fiber spinning art, particularly by increasing the spinning speed. Thus, the

second scenario seems more plausible, in that, Howell's maximum spinning speed was in the neighborhood of 2,000 m/min.

The above reasoning, combined with the facts that Howell recognizes the problems of high-speed spinning and that Howell fails to make any explicit reference for spinning at 3,500 m/min, suggests that Howell could not have meant spinning at a speed of 3,500 m/min. Or else, Howell would have claimed it.

To fill in the spinning speed lacuna in Howell, the Examiner combines the Hwo reference with Howell arriving at the conclusion that the combination discloses the speed element of SO0033's Claim 47. Appellants respectfully disagree. Apart from the fact that Hwo deals explicitly with partially-oriented yarns (see discussion below), it is not that high-speed spinning was not known, at all, in the fiber spinning art, and/or that Hwo discovered high-speed spinning. High-speed spinning has been well-known in the fiber spinning art. However, such know-how cannot be universally applied to all fiber spinning processes under the maxim "one size fits all." Depending upon the process, for example, textile, BCF, staple, fine denier, etc., the spinning speeds vary. The issue is Howell, desirous of high-speed spinning but nevertheless cognizant of high-speed spinning problems in BCF yarns, used a speed of about 2,000 m/min. SO0033's breakthrough was in going beyond Howell's speed for BCF yarns, which it achieved by carefully selecting its processing criteria (elements of Claim 47) that provide an otherwise unpredictable result of spinning of BCF yarns at 3,500 m/min.

The Examiner states that Hwo discloses high-speed spinning. We do not disagree. In fact, Hwo explicitly discloses drawing yarns at speeds as high as 10,000 m/min. But the question is, for what type of yarn? Hwo answers this question without any ambiguity. Hwo's invention specifically caters to a POY yarn, or partially-oriented yarn. (See Hwo, for example, the Title of the Invention, the Field of the Invention, Paragraph [0002] the Background of the Invention, the Summary of the Invention, etc.) Hwo defines what it means by a POY yarn. According to Hwo, POY yarn is drawn less than normal, that is, less than that used to make fully-oriented yarn (FOY), resulting in only partial longitudinal orientation of the polymer molecules. (See Hwo, Paragraph [0002]). A POY yarn is subsequently drawn to a finished product, generally for textile use (and not carpets). And that is the reason why Hwo's draw ratios are in such low a range as 0.7 to 1.3 (See Claim 1). On the other hand, it is clear to a person skilled in the art that one does not and can not use a POY yarn directly for BCF/carpet use. Why? A BCF yarn possesses crimp (e.g., curvilinear crimp). Now if a BCF yarn were to be a POY yarn, it essentially means that such yarn will undergo a subsequent drawing. It would be counterintuitive and redundant to introduce crimp in a yarn for BCF purposes, and then draw the yarn out, thereby losing the crimp, the bulk, and consequently the yarn character as a BCF yarn. That would completely defeat the purpose of the BCF yarn (introduce bulk by crimping). A person skilled in the art would not use a POY yarn for BCF purposes. Thus, Hwo, or any other reference teaching POY yarn, inherently teaches away from making a BCF yarn. Appellants thus find that combining Hwo with Howell goes against the spirit of KSR, which states that:

> [A] patent composed of several elements is not proved obvious merely by demonstrating that each of its elements was, independently, known in the prior art. Although common sense directs one to look with care at a patent application that claims as innovation the combination of two known devices according to their established functions, it can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to

> combine the elements in the way the claimed new invention does. This is so because inventions in most, if not all, instances rely upon building blocks long since uncovered, and claimed discoveries almost of necessity will be combinations of what, in some sense, is already known. (KSR *at* 1741).

Howell and Hwo are such building blocks. However, apart from the fact that there is no reason to combine them, for a person skilled in the art, there is even sufficient negative indicia in Hwo against combining them, simply because Hwo relates to a POY yarn. And by combining Howell and Hwo, the Examiner's argument directly contradicts KSR's spirit.

2. Melt-Viscosity and Molecular Weight Issues

The Examiner states that although Howell and Hwo do not disclose the PTT polymer's specific molecular weight and specific melt-viscosity, the references inherently disclose such molecular weights numbers (29,000 to 40,000 Da) and viscosity numbers (450 Pa to 700 Pa). Furthermore, according to the Examiner, the Wandel reference discloses the melt-viscosity of the claimed invention, i.e., the range of 450 to 700 Pa because it discloses a melt-viscosity of 325 Pas. Thus a combination of Wandel with Howell and Hwo would make the relevant elements of SO0033 Claim 47 obvious.

Appellants respectfully disagree. With regards to the specific molecular weight range inherently disclosed in Howell and Hwo, Appellants submit that they never claimed to have invented such molecular weights for fiber spinning. Stated another way, Appellants do not in any way suggest that such molecular weights were hitherto unknown for fiber spinning purposes or otherwise, for PTT or any other polymer. Appellants merely point out their surprising discovery of a narrow range of molecular weight, which, when combined with other Claim 47 elements, provides the unexpected improvement of about 75% in spinning speed of PTT BCF yarn. The molecular weight range is from about 29,000 to about 40,000 Da, that is, a spread of about 11,000. The narrow molecular weight range is a contributory factor in achieving the unexpected result of a 75% improvement in spinning speed of PTT BCF yarn.

Similarly, the Examiner cites the Sun reference, teaching a PTT with a number average molecular weight of less than 40,000. Appellants repeat that SO0033 is not the first to invent PTT of molecular weight 40,000. Appellants merely point out SO0033's narrow range of molecular weight when combined with other Claim 47 elements results in the unexpected improvement in the PTT BCF spinning speed. Appellants also point out that Sun discloses a laundry list of polymers (See Sun, Paragraph [0043]-[0051]) providing no guidance as to the PTT molecular weight range of the SO0033.

With regards to the Wandel, Appellants respectfully disagree with the Examiner that because Wandel discloses a melt-viscosity of 325 Pas, the claimed melt-viscosity range of 450-700 Pa is obvious. Appellants calculate the difference between the lowest point of the claimed range of melt-viscosity with the Wandel melt-viscosity:

% Difference in Viscosity = 100 X (450 Pas -325 Pas)/ 325 Pas
= <u>38%</u>

Thus, the Wandel melt-viscosity is at least 38% lower than the lowest point of the claimed range. A person skilled in the art would hardly arrive at the conclusion of using the claimed range from the Wandel's disclosure of melt-viscosity at 325 Pas. A difference of

38% cannot be construed as obvious. And that is not all. Wandel's viscosity is measured at 2 Hz. On the other hand, SO0033 melt-viscosity 's was measured at 48.65 per second. If the Wandel viscosity were to be measured at SO0033's high shear rate, it certainly would decrease (a polymer science-related fact known to a person skilled in the art). This would further widen the chasm between Wandel and SO0033 melt-viscosities clearly making the claimed range non-obvious over Wandel.

3. Intrinsic Viscosity of SO0033

Howell discloses using an intrinsic viscosity of 0.6 to 1.3 dL/g. On the other hand, SO0033 uses an intrinsic viscosity of 0.95 to 1.04 dL/g. In other words, SO0033 carves out about 12% of the total range suggested by Howell. This narrow range of intrinsic viscosity is a contributory factor to making the SO0033 PTT polymer composition amenable to high-speed spinning for BCF purposes.

B. Predictable Solutions from Prior Art

The KSR Court also instructed that "[w]hen there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation but of ordinary skill and common sense. In that instance the fact that a combination was obvious to try might show that it was obvious under § 103." (KSR at 1742).

In the present situation, there was need to improve the spinning speed of the PTT BCF yarn as it would improve productivity of the BCF process. However, there simply were not a finite number of identified and predictable solutions, that is, obvious solutions. For example, from the reference art and from the knowledge of a person skilled in the art, the person skilled in the art could potentially elect from thousands of different polymer combinations and additives (See for example, Sun, Paragraphs [0043]-[0051]), hundreds of different ranges of melt-viscosities, hundred of different ranges of intrinsic viscosities, and hundred of different ranges of PTT molecular weight, in addition to several available variations in other elements of Claim 47 (types of extruders, draw ratio ranges, etc.). With so many variables, a person skilled in the art would find it impossible to predict the likely outcomes for each such variation or combinations thereof. Clearly, in the present situation, many solutions, without any predictive guidance, were available. Thus, the SO0033 solution to high-speed spinning is non-obvious under 35 U.S.C. § 103(a) in light of the reference art combinations proposed by the Examiner.

In summary, SO0033 discloses a specific combination of familiar elements, which, when combined, yield an unexpected result—a spinning process for PTT BCF yarns that is 75% higher in spinning speed over its closes prior art. Thus, in element after element, SO0033 provides striking differences with the reference art, and with the two main references Howell and Hwo, even more. SO0033 teaches against what is cautioned by Howell, that high-speed drawing of BCF yarns reduces bulk and should be avoided. In fact, SO0033 does even better, it produces an unexpected result, a 75% improvement in the fiber spinning speed over Howell. Hwo on the other hand, does not even apply to SO0033. Simply the fact that Hwo is a POY yarn, negates its fruitful combination with Howell, which relates to a BCF yarn. As discussed previously, a person skilled in the art would not use a POY yarn for BCF

purposes. And finally, the SO0033 invention could not have been predicted simply from the reference art.

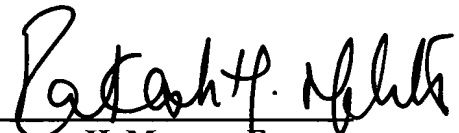
IV. SUMMARY

For the remainder of the Examiner's assertions in the Examiner's Answer, Applicants incorporate by reference the Appeal Brief in its entirety.

For the reasons set forth above and in the Appeal Brief, Appellants respectfully request the Board of Patent Appeals and Interferences to reverse the final rejection of pending Claims 8, 11, 14, 20, 23, 24, 26, 29, 33, 41, 42, 46-48, and 50-54 and indicate allowability of claims.

RESPECTFULLY SUBMITTED,

DATE: JULY 01, 2008

BY: 

RAKESH H. MEHTA, ESQUIRE
ATTORNEY FOR APPELLANTS
REGISTRATION NO.: 50,224
PHONE: 302-984-6089
FAX: 302-658-1192